



# INDIMO Communities of Practice in Monghidoro, Antwerp, Galilée, Madrid, and Berlin: A Common Space for Co-designing Inclusive Digital Mobility Solutions

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**Abstract.** This paper demonstrates the co-creation process of digital mobility and delivery services applied in the Inclusive Digital Mobility Solutions (INDIMO) project mainly based on the local Communities of Practice (CoP) drawing on the knowledge and experience of their members to propose solutions adapted to their needs and interests. In the context of the INDIMO project, CoPs were established at five pilot locations and included users, mobility service providers, (digital) developers, user interface designers, and policymakers associated with each pilot. This chapter aims to report on the experience of the INDIMO project in employing the CoP as a tool to integrate the development of digital mobility and delivery services and the contribution and cooperation of different actors such as operators, developers, policymakers, and organizations representing the end-users. The creation of common spaces such as the INDIMO communities of practice was fundamental to enhance cooperation among different actors, co-design inclusive digital mobility solutions, and empower the participants in using the above-mentioned services. This chapter shows the development of the CoP process, the activities and challenges, and its role in making digital mobility services inclusive and universally usable.

## 1 Introduction

Communities of Practices (CoP) are a group of people who share a concern or a passion for something they do, and learn how to do it better as they interact regularly (Wenger

et al. 2002). CoPs have been extensively observed in a variety of contexts, such as in the educational or medical sector. The Inclusive Digital Mobility Solutions (INDIMO) project has explored the potential of Communities of Practice (hereinafter referred to as CoPs) by setting up and running local CoPs for its pilots where a digital mobility or delivery service was developed or redeveloped taking the principles of Universal Design into account. Each Community of Practice brought together local users, mobility, and delivery service providers, (digital) developers, user interface designers, and policy-makers associated to each pilot. At the beginning of the project, for each pilot, a call for participation was launched to engage interested parties into a collective learning process. The main objective of these Communities of Practices was to contribute to develop the INDIMO Co-creation Community and to identify the profiles of user groups in situation of vulnerability with respect to the digitalization of mobility with their requirements and needs.

The co-produced common knowledge within the local CoPs was consolidated and served as structured feedback for developing various components of the INDIMO digital mobility toolbox, including the Universal Design Manual (UDM), the Universal Interface Language (UIL), the Cybersecurity and privacy assessment guidelines (CSG), the Service evaluation tool (SET) and designing social and educational strategies for enhancing the appropriation of the use of digital mobility services (DMS) and digital delivery services (DDS).

The creation of a safe space such as the INDIMO CoP was crucial to build up common knowledge on the local context, inclusive digital mobility solutions and empowering the participants, including the target groups of vulnerable users. We concretely learned that the creation of the shared space provided by the Communities of Practice (CoP) during the project timeline enhanced the collaboration among different actors who oversee digital, physical, and regulatory features of digital mobility and delivery solutions. In the next sections, we will outline the setting up process of the local CoPs' and their role in identifying the key elements that digital mobility and delivery services should include to be inclusive and universally usable. Section 2 includes the description of the key characteristics of the five Communities of Practice located in each INDIMO pilot location. Section 3 presents the typology of members for each CoP, while Sect. 4 underlines the notable points of the CoP activities and the results of each CoP conversation. In Sect. 5 we share the lessons learned. Finally, insights and conclusions are summed up in Sect. 6, including a reflection on the relevance of sharing different knowledge and perspectives with a universal design approach in the era of digitalization.

The results presented in this chapter refer to the 3 years when the INDIMO project was developed (2020, 2021 and 2022). The content is mainly based on the INDIMO Deliverable D3.2 *Communities of Practice Report*.

## 2 The INDIMO Pilots and Organization of CoPs

Each pilot and the related CoP in the INDIMO project had a different aim with the common goal of improving the inclusion and accessibility of digital mobility services for the identified target groups of people in situation of vulnerability (see Fig. 1). Local CoP members participated in the co-creation process of the five pilots. As an open group,

anyone could join and leave at any time, yet CoPs were made up of people who were interested in the development and potential growth of the different digital mobility and delivery services.

The figure below shows an infographic of the five different INDIMO pilots, indicating in the outer circle the digital mobility or delivery service of the pilots and in the inner one the target groups that were involved.

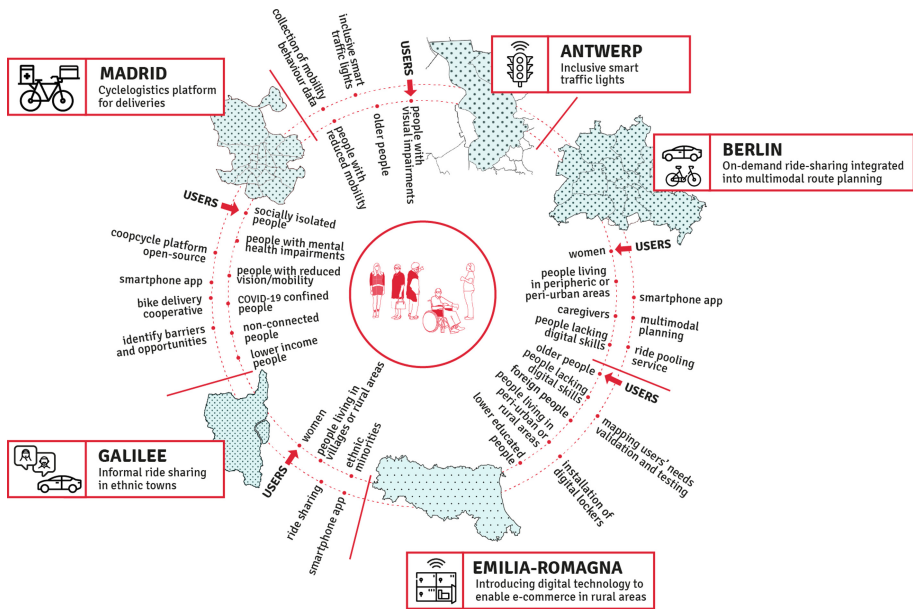


Fig. 1. INDIMO Pilots

### *Pilot 1-Monghidoro, Italy*

Pilot 1 (P1) was located in Monghidoro (Emilia-Romagna Region) and aimed to introduce digital technology to enable e-commerce in rural areas to increase the inclusion and accessibility of digital mobility services. Its main activity was the installation of an advanced digital locker operated by Poste Italiane. This service offers the possibility to ship and collect parcels, collection of signed correspondence, postal bill payment, recharging of telephone cards and prepaid Poste-pay cards, and management of customer-to-customer deliveries. The main target population group of P1 were rural residents of Monghidoro, specifically older people with a low level of digital skills and low-income migrants with lower proficiency of the local language (i.e., Italian).

Monghidoro is a small municipality with about 3700 inhabitants about 50 km from Bologna. Based on the index of the Metropolitan City of Bologna, it is classified as highly vulnerable because of a combination of reasons such as low income, a high number of elderly people and migrants, and decreasing population.

Due to the Covid-19 restrictions, the CoP meetings in this pilot were organized both in person and online, participants had a preference for holding in = person meetings.

### *Pilot 2-Antwerp, Belgium*

Pilot 2 (P2) based in Antwerp set up a CoP focusing on the inclusive smart traffic lights and had the purpose of sharing experiences and providing feedback about the proof-of-concept smart traffic light smartphone application, physical and online accessibility, the use of the public space, and the relationship of pedestrians with other modes of transport (i.e., cars, bikes, e-scooters). The CoP was a space for sharing knowledge and collectively solving problems about specific conditions that older people with visual disability face when independently moving around in the urban environment.

Given the Covid-19 restrictions, most of the CoP meetings were organized in an online format, which facilitated the engagement of stakeholders living in very different locations in the Flemish region. Therefore, even when the restrictions were lifted, the activities remained online.

### *Pilot 3 (P3)-Galilee, Israel*

As a result of the lack of public transportation, an informal rideshare service in Pilot 3, based in the Galilee region, aimed to promote the status and rights of Arab women, create alternative travel options for them and increase their mobility for achieving key-life activities (e.g. work, school, hospital). The application for the rideshare service (named SAFARCON)<sup>1</sup> is free and enables drivers to connect with passengers who are traveling to the same destination. It also allows drivers to schedule package deliveries. It aimed to provide access to workplaces in the metropolitan area and higher education both to the Arab community as a whole and Arab women particularly, as well as those living specifically in rural areas. It is important to understand that in Galilee, women do not enjoy always the same opportunities as their male counterparts. Therefore, this pilot had the potential to empower women by giving them access to education and enhance their participation in the job market.

The idea was to promote informal ride sharing in a rural ethnic area of Galilee. The CoP discussed accessibility approaches to an inclusive digital mobility service, as well as the consideration of both gender and ethnic perspectives, language and cultural barriers to service access, and accessibility to technology for vulnerable minority groups of Arab women.

As part of periodic open group CoP meetings, a wide range of participants had the chance to share their perspectives, knowledge, and experience, including users, mobility service providers, digital application developers, user experience designers, and policymakers involved in the pilot, as well as other stakeholders including traditional transportation and digital mobility actors.

The collaboration and interactions between participants were fundamental in enhancing inclusive digital mobility solutions, facilitating the progress of the Galilee Pilot, and advancing INDIMO as a whole.

### *Pilot 4 (P4) -Madrid, Spain*

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<sup>1</sup> Technion's Transportation Research Institute (TRI) developed the application SAFARCON in collaboration with Kayan, a feminist Arab non-profit organization, under a grant from the Office of the Chief Scientist at the Israeli Ministry of Transportation (MoT) several years ago.

Pilot 4 was located in Madrid and aimed to enable food delivery for people with impairments, such as reduced mobility or vision, mental disability, low-income people, lower digital connection, socially isolated (e.g., unwanted loneliness), Covid-19 isolation through a digital application. The use of an existing cycle logistics platform was tested from users' experience and needs perspective to make this platform more inclusive and accessible. The digital food delivery platform was developed by the European Federation of Bicycle Delivery Cooperatives (Coopcycle), based in France, and it enables cooperatives of riders to operate a food delivery service at the local level with an inclusive approach. In Madrid, the service is operated by La Pájara, which operates the food delivery service from a set of more than 30 restaurants, including vegan ones, to users via the Coopcycle website and application. The main aim of this pilot was to improve the access of the target groups of the population to healthy food.

The CoP in Madrid aimed to discuss among the relevant actors the proximity and ease of use of food delivery as a way of tackling the isolation of target populations. Safety and security concerns were also discussed, along with the specific situations that arose during the Covid-19 pandemic. Digital skills and technological barriers were also important matters of discussion.

The CoP was a safe space for sharing knowledge, while discussing accessibility and inclusivity of a digital delivery service in an urban context. The CoP was intended to find solutions to accessibility problems for specific target groups of the population. Given the Covid-19 restrictions, also this CoP meetings were mainly organized in an online format. This format facilitated the engagement of stakeholders living in very different locations in Madrid. Even when the restrictions were lifted, the activities remained mainly online with some events in person.

#### *Pilot 5 (P5)-Berlin, Germany*

Pilot 5, based in Berlin, had the initial aim of increasing access and providing individual mobility for women as caregivers through a door-to-door ridesharing service. The service sought to improve short-distance mobility of women with children, offering a connection to public transport stations, facilitate short walking distance to pick-up and drop-off points, cover the lack of transport services in peripheral locations and lack of digital skills or low speed of internet connections. An existing multimodal mobility platform was tested by users to make this platform more inclusive and accessible to women as caregivers. This digital platform for trips planning had been developed by the IT developer of door2door and it enables public transport and digital mobility operators to provide an integrated service (i.e., MaaS).

The CoP focused on co-creating knowledge, discussing mobility needs of women as caregivers and sharing their experience in public transport and space. It was mainly oriented to the co-design of digital mobility services that generate confident relationships among caregivers and women, empowering them and fostering sharing of experiences through empathy.

### 3 INDIMO Community of Practices: Activities, Characteristics and Participants

This section will present the activities, characteristics, and participants of the five CoPs set up within the INDIMO project. As the target groups varied greatly among the pilots, participants also varied among the different CoPs and over time within each CoP. However, the aims remained focused on giving participants a platform to share their life experiences for improving a human-centered design of digital mobility solutions.

The CoP of Monghidoro (P1) included institutional actors such as the data and ICT services provided for Emilia-Romagna Region (LEPIDA), the Municipality of Monghidoro with its Mayor; the Metropolitan City of Bologna with its Mobility planning and social area department, rural residents, and two local NGOs, one representing elderly users (Le Pozze) and another one representing especially migrants' residents. This CoP was specifically oriented to involve other rural residents coming from municipalities close to Monghidoro, elderly residents, and residents of migrant descent of non-Italian nationality. It was facilitated by INDIMO partners, including the Institute for Transport and Logistics, Poste Italiane, cambiaMO, and DeepBlue.

The Antwerp CoP (P2) community was composed of a diverse group of stakeholders, representing different perspectives and roles in the digital mobility ecosystem. The Community members consisted of intersectional representatives of elderly people and people with visual impairments, developers, and user interface designers, policymakers from the Antwerp municipal services of mobility, regional accessibility agency, mobility service operators, and, most importantly, end-users in situation of vulnerability.

Facilitated by the online format, the Antwerp CoP was able to establish a broader stakeholder community and expand its scope and impact from the city of Antwerp to the Flemish region. In this way, the CoP was able to engage users, representatives, civil servants, and other stakeholders in providing their views coming from the perspectives of the different cities. Moreover, it facilitated the identification of common regional challenges and needs.

To gather feedback from visually impaired users, in some CoP activities, we conducted a series of one-to-one interviews. The interviews followed the same format as the CoP activity. The outcomes of the interviews were then shared during the CoP with other stakeholders. In some situations, where the one-to-one interview was not possible, a breakout room with a facilitator was created for each visually impaired participant.

The CoP in Antwerp (as most of the other CoPs) set up the invitations with a clear agenda and expectations for the different stakeholders. This proved to be effective in maintaining the active participation of the different stakeholders throughout the INDIMO CoP cycle. The type of stakeholders participating in each activity, therefore, varied according to the topic of the activity. As an example, in the activities related to the end-user appropriation of digital mobility tools or the re-design of the proof-of-concept application the feedback from User Interface designers, developers, and visually impaired users proved to be more relevant. Moreover, we learned that stakeholders, especially civil servants, and service providers, are more eager to participate if there is a dissemination of the results during the CoP activities.

The CoP in Pilot 3, in Galilee was the most diverse in terms of its members during the timeline of its meeting sessions. Given this diversity, the authors of this chapter found

it appropriate to list the members in Table 1. All CoP members were invited to join CoP meetings regularly, yet each meeting consisted of a slightly different mix of seasoned participants making each meeting dynamic and interesting in its way.

In the pilot 4 in Madrid, we organised regular meetings and included a wide range of participants, such as:

- policy maker from the Municipality of Madrid,
- representatives of target groups including the *CEAPAT- Imserso*, representing persons with both mental and physical impairments and elderly,
- *Tangente*, representing the elderly women socially isolated,
- *Asidown*, representing persons with a mental disability such as down syndrome
- *ONCE*, representing persons with reduced vision,
- Representatives from the delivery- operator La Pajara,
- Digital developers (from Coopcycle, the cooperative digital platform used by la Pajara, and another representing as well the end-user person with reduced vision)
- User Interface designers

These participants had the chance to share their points of view, knowledge, and experiences from different perspectives: as users, mobility service providers, digital application developers, user experience designers, and policymakers. At the beginning of each session, participants introduced themselves and their motivation for taking part in the CoP. The CoPs activities included the assets, values, and the functioning of the platform; the users' requirements prioritization, the persona construction; and the co-design of a mobility and delivery inclusive service.

Finally, for pilot 5 in Berlin, the Community of Practice mainly included (digital) developers and User Interface designers, product managers, a researcher in gendered mobility, and public transport representatives including local users, mobility and delivery services providers, to develop common knowledge around the inclusiveness of the ridesharing app.

## 4 Relevant Topics and Issues that Emerged During CoP Activities

The main topics that arose during the CoPs co-creation and co-design processes include different key themes:

- 1) the discussion around capabilities, limitations, and requirements elaborated through the analysis of semi-structured interviews,
- 2) the rating exercise of the users' requirements that have nourished the elaboration of the Universal Design Manual,
- 3) the assessment of the icons used in the various digital services for creating the Icons and Languages catalog, and
- 4) the co-design of the implementation of the recommendations for an inclusive and accessible digital mobility and delivery service.

**Table 1.** P3-Galilee community members

#	Title	Type
1	Israel's National Accessibility Supervisor Equal Rights Commission for the Disabled, Ministry of Justice	Policymaker
2	Chief Scientist at the Israeli Ministry of Transportation	Policymaker
3	Former Treasurer at the Israeli Ministry of Transportation involved with SAFARCON App original development	Policymaker
4	City Planner, The City of Jerusalem	Policymaker
5	Strategic planning at Ayalon Highways	Policymaker
6	World Bank Transportation Strategy	Policymaker
7	<a href="http://www.thejoint.org.il">http://www.thejoint.org.il</a> - The Joint - independent living for people with disabilities	NGO, influencing Policy making
8	<a href="http://www.techpolicy.org.il">http://www.techpolicy.org.il</a> - Israel Tech Policy Institute	NGO, influencing Policy making
9	<a href="http://www.Nanooa.org.il">http://www.Nanooa.org.il</a> - promoting realization of opportunities inherent in the field of smart-transportation for the benefit of the public	NGO
10	<a href="https://www.kayanfeminist.org/home-page">https://www.kayanfeminist.org/home-page</a> Kayan - an Arab feminist organization with the goal of advancing the status of Arab women in Israel and protecting their rights	NGO. Users' representative
11	Arab women - SAFARCON drivers and passengers	Users
12	Arab women students and researchers	Users' representatives
13	Nadsoft – Arabic-speaking software developers	Developer
14	Urban Mobility software developer	Developer
15	Researcher in Human Factors Design	UX/UI
16	Cactus Ads and More – Arabic-speaking digital advertising and marketing office	Marketing
17	Transportation planner involved in SAFARCON development	Planner
18	Head, The Israeli Smart Transportation Research Center	Researcher
19	Transportation researcher Involved in SAFARCON development	Researcher
20	Researcher in Ride Sharing	Researcher

*(continued)*



**Table 1.** (continued)

#	Title	Type
21	Researcher Travel Behavior and Safety Evaluation	Researcher
22	Researcher Candidate, Smart Mobility, and the Human Factor	Researcher
23	INDIMO Partners	Researcher

In this section, the main topics from above are presented. It is, however, very important to underline that CoPs faced very practical problems, such as the difficulty of organizing the events at a time suitable for everyone, as policymakers are generally available during the day while users or associations can participate in the CoP activities outside working hours.

In the case of pilot 1 in Monghidoro, one issue was related to the difficulties of meeting on-line. As the target groups were elderly people and people with low digital skills, it was challenging to involve them using the virtual space. Elderly people were involved but health issues related to Covid-19 complications meant that they were no longer able to join. Despite these difficulties, the CoP meetings were lively and explored various challenges, and several themes emerged concerning the domain of the smart locker service implementation in a rural context. These themes are explained below.

During the 11 CoP sessions, there were concerns with regards to the deploying of the service of a digital locker, and particularly if this was meant to replace the existing physical Post Office. The digital locker was perceived as a threat, as in the eyes of the participants it could overtake the role of the physical office. In addition, in the small municipality of Monghidoro, rural residents recognized and attributed social value provided by the few (public) meeting points (such as the post office).

The negative perception of the digital locker is probably connected to the fact that over time, Monghidoro residents had perceived a decrease in the accessibility and availability of basic services. Some activities of the CoP were, therefore, also focused on enabling participants to understand that the digital locker service was an additional service and not a replacement for the current national postal service.

In the case of pilot 2 in Antwerp, the most important topics discussed during the 13 CoPs included: (i) the importance of a well-designed and accessible urban environment, (ii) the different needs of visually impaired users concerning other types of vulnerable populations, (iii) the importance of peers in adopting an application, and (iv) the recurrent issues visually impaired users experience when using digital tools. The complexity and unpredictability of the urban built environment was a key limitation in the autonomy of visually impaired users. As an example, ramps on the sidewalks to cross the street were perceived as a physical barrier for visually impaired people since their dogs could not distinguish where the road started.

Technology has a key role in supporting visually impaired people in navigating the physical space and is evolving to incorporate these urban elements. Visually impaired people tend to be very skilled in using digital tools, older people instead experience many challenges related to technology adoption and usage. Older people, even if affected by

visual limitations, have very different needs and technical skills than the average visually impaired people. Today, readers incorporated into different digital systems enabled the usage of any application for visually impaired users. However, not all the applications are accessible to them, making the process of selecting and downloading the apps is difficult. Even more, the reviews of the applications do not take into consideration accessibility for visually impaired users. Consequently, the adoption process relies mostly on the recommendations of their peers.

In pilot 3, in Galilee, CoP meetings were organized around well-defined agendas that included icebreakers, polls, and role plays followed by an open discussion. As a first step, it was important to have the developer explain SAFARCON, the app that aimed to address mobility needs of the Arab community and women. One of its main goals was to improve its service accessibility. CoP participant stakeholders noted that mainly young people downloaded the application and brought up the issue of women's experience. Women must feel comfortable ridesharing with strangers and be confident about the safety of the vehicle. App integration with social media was highlighted as a safety measure, as users would be able to know their Facebook friends' usage and opinions.

The CoPs discussions revolved around how social media influencers, radio shows, and authorities could endorse and promote app use. The main conclusion was that it was crucial to know who the recipients of the design were, because icons do not have a single meaning<sup>2</sup>.

Looking at how social norms, culture, language, and gender influence the appropriation of mobility apps, we found that it boils down to subjective personal preference, taking into consideration usability, privacy, security, accuracy, reliability, and functionality. In addition, limitations in storage or battery usage of apps, as well as cyber security concerns, affect the adoption and use of digital mobility apps<sup>3</sup>.

The outcomes of the activities developed within the CoP in pilot 4 in Madrid were beneficial over a wide range of aspects, from the fieldwork deployment of tasks related to the specific objectives of the INDIMO project to the co-created implementation of service improvements and organizational measures. Conducting the co-creation work implied a good number of challenges and obstacles that had to be overcome, especially when the aspiration was to build up a local Community of Practice among stakeholders and researchers who have not experienced this kind of knowledge consolidation tool. The main ideas of the CoP were oriented towards the service and the social economy and sustainable values that it conveys, the actual and potential target audience, and elements of usability of the app itself.

Another argument that emerged was the focus on the ethical approach of the delivery company, mainly towards its workers, and in its way to offer a more inclusive and accessible digital delivery service. This last point implied the recognition of a limitation that

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<sup>2</sup> Stakeholders' suggestions to make the app more accessible and help overcome digital barriers were summarized in the INDIMO Deliverable D2.1 - Universal Design Manual and the detailed assessment of screens and icons is presented in the Deliverable D2.3 corresponding to the Universal Icons Language.

<sup>3</sup> The INDIMO Deliverable D2.5 Enhancing Appropriation of Digital Mobility Solutions contains a more detailed analysis of the results of the appropriation exercise.

La Pájara had: a very homogenous base of users, characterized by their young age, high level of education, digital competency, and social and environmentally aware population. Nevertheless, the type of inclusive digital and physical services adaptations and how to implement them were also raised during the CoPs debates. There is a realization that attaining inclusivity in the digital realm takes effort. Full comprehension of the concept of universal design appears.

Participants understood and suggested that the co-design and update of the delivery service platform goes beyond simply adjusting for special needs, but rather aims to meet a wide range of universal requirements. There were some people who were concerned about the fact that the app was too focused on food delivery, and not on a more general courier service, from which it could benefit. The emphasis was on organic growth and inclusion of new users, especially coming from the target-groups of people in situation of vulnerability that are not always addressed by other food delivery platforms, recognizing that food delivery can facilitate their daily lives. During the debates, some people also suggested micro-training for riders, in order to better address the needs of people in situations of vulnerability. In the third phase of the pilot, (deployment), this suggestion was realized through the inclusive training for riders.

CoP meetings of pilot 5 in Berlin were systematically organized around an agenda related to the co-creation activities of the INDIMO project oriented to identify the capabilities and requirements of women caregivers and with children; elaborate and select the Universal Design Manual recommendations for making the ridesharing service more inclusive for women caregivers of children and finally redesign the service by prototyping an app-based security function including three different degrees of safety: the emergency assistance bottom, silent alert for the driver, and silent alert driver's view. During the first meetings, the participants were asked about their interests and how they be could integrated into the discussions of the community of practice. There were doubts among participants about the project, whether it is about the development of an application or a local service strategy. Participants introduced themselves and described how they could contribute to the pilot. There were a few main points raised during the debate on the timeline. The mobility of women with children is a particular concern. One participant claimed that a similar service (titled Berlkönig) was offered as a ride-pooling service in a different peri-urban area. The importance of understanding the needs of women as caregivers was emphasized, specifically since transportation organizations rarely involve women in their discussions.

## 5 Outcomes

In this section the outcomes from the individual CoPs in the five pilots are summarized.

For pilot 1, in Monghidoro, the matter of the digital divide due to age and the adaptation and interest of different generations to the technology is a subject that frequently arose. It is expected that the impact of the inclusion will be differentiated for different segments of populations. Many residents (not just elderly people) feel unfamiliar with services that rely on “technology”, intended as mobile phone apps, QR codes, payments through the internet, and so on. The need for on-site training, of a person, that “can show how it is done” and the initial availability of in-person assistance must be considered to introduce rural elderly and lower-skilled target groups of users to this digital

service without fear. This need was also recognized as the top priority for policymakers, end-users, and stakeholders' organizations across all pilot processes.

The outcomes of the CoP in pilot 2 in Antwerp served to improve the different aspects of the CoP itself, from the organizational part to the way each CoP content was delivered to the participants. The main learnings for P2 included the following recommendations:

- Send a clear agenda with a clear description of what the expectations are towards each type of stakeholder. This would allow CoP participants to decide if their participation is relevant.
- Dedicate some time of the CoP to share project progress and learnings. Stakeholders, especially civil servants, and service providers will be more eager to participate.
- Check the accessibility of the tools and materials you will use during the CoPs.
- Engage end users in providing feedback about the use of digital tools. Representatives do not have deep knowledge about the use of digital mobility applications as visually impaired users.
- Organize one-to-one interviews or breakout rooms to facilitate the collection of feedback from visually impaired users. Visually impaired users are overwhelmed in large meetings. They often have difficulties following and participating in activities.
- Send the material in advance to visually impaired users. In this way, they will be able to read the questions and reflect on them before the activity.

In the case of the pilot 3 in Galilee, the expectation to build a local Community of Practice including stakeholders and researchers was challenging. Many of these stakeholders had limited time and no prior experience with such a method. This posed challenges that had to be overcome during the co-creation process. Despite this, as soon as they accepted the invitation to participate, they were engaged and wanted to contribute with their knowledge and insights. Additionally, the open group allowed participants to join and leave at their convenience, making it easier for them to commit according to their schedules.

Fundamentally, it is crucial to think of "Accessibility" from the perspectives of both "App Accessibility" (digital accessibility) and "Service Accessibility". An app may be accessible, but the service itself may not be, for example, a vehicle that is too high for a person with a disability.

Local CoPs played a key role in identifying and recommending the key elements that a mobile and delivery service should contain to be inclusive and universally usable. The need for human assistance was the top priority for policymakers, end-users, and stakeholders' organizations across all co-creation activities relating to inclusive digital mobility.

At the time of Covid-19, the CoP had to be carried out on a digital platform. Some participants had very low familiarity with any type of digital tools and in some cases, for older people, it was the first time that they participated in a videoconference. The availability of the local pilot leaders was the key to guarantee the success of CoPs meetings. This is a clear example of empowering target-groups, that makes the CoP unique in the co-creation process. As a result, CoPs had resources for hypotheses, conjectures, and possible scenarios for participants to talk about their beliefs and feelings about technology and mobility and delivery services.

Users sometimes they talked freely about their concerns and interests in general digital services or general characteristics of technology in services. Thus, the facilitator should drive them back into focus on the CoP aims. There is a general feeling of having consolidated local CoPs in a good way. The great number of verbatims and contents produced for the rest of INDIMO tools (i.e., Universal Design Manual and the Universal Icons languages catalog) anticipates a high level of inputs for clear guidelines for the INDIMO Digital Mobility toolbox.

The recursive appearance of beliefs, motivations, and feelings shared by several participants lead to believe that there are social representations and images about digital mobility and delivery services that should be considered at the time of designing technology for including end-user target groups.

The recruitment of end-users was a challenge for pilot 5 in Berlin because the local partner Door2Door was a white-label platform offering the integrated ride-pooling service to public transport operators and mobility providers but not operating its own service. Then, single mothers in Berlin, Germany were recruited through the Door2Door network responding to profiles through fieldwork in Marzan, a suburban municipality where this profile of person in situation of vulnerability was concentrated. Concretely, the CoP of Berlin shows the development of an emergency button concept that focuses on perceived safety. Therefore, different scenarios were derived to understand when women feel uncomfortable when using ride-pooling services. Three stages of severity of perceived safety are conceptualized: yellow (relatively safe), orange (moderately safe), and red (extremely unsafe).

Subsequently, developers in Berlin, prototyped an app-based security function for each of these situations. This concept goes beyond the well-known emergency breaks in public transportation systems and takes into consideration that security-critical situations many times are very nuanced and need differentiated solutions.

## 6 Lessons Learnt Across the Pilots

The INDIMO CoPs revealed several common aspects. Firstly, conducting the co-creation work implied a good number of challenges and obstacles, especially when there was the aspiration to build-up a local Community of Practice within stakeholders and researchers who did not have experience with this kind of knowledge consolidation tool. To support this process, bilateral and collective training sessions were arranged with pilot leaders before starting the meetings of the CoP.

Secondly, all CoPs co-created and contributed with valuable inputs to the INDIMO toolbox within local stakeholders and target-groups of users. Examples of the contribution were the following: prioritizing the requirements to make digital mobility and delivery services inclusive, selecting the appropriate interface icons for different scopes, insights on the appropriation digital tools for carrying out daily live activities of people in situations of vulnerability.

Thirdly, the conversations within the COPs were mainly focused on the problems and participants were eager to contribute and to find common solutions to these common problems. This feeling arose from the CoP where all the practitioners were enthusiastic about their participation and felt safe and comfortable in the space (both virtual and

physical) created to talk about these issues. Most participants were aware of the benefits and disadvantages in developing inclusive digital services.

## 6.1 New Insights and Conclusions

Despite their differences the CoPs provided several interesting general outcomes. In this section, the key insights and conclusions are presented. These are common across all CoPs.

CoPs can be used in a variety of contexts, and specifically in the realm of digital mobility services, where they can provide expertise and knowledge coming from specific target groups.

There is a need for training facilitators when CoP are set up and run. This training is essential for organizing the CoPs as a safe space for co-creational and co-designing activities. In our case, the profile of a CoP facilitator featured technical notions of Digital Mobility and Delivery services, as well as (and perhaps more importantly) excellent communication and listening skills.

The COVID-19 pandemic measures imposed the use of virtual space for running the INDIMO CoPs. This aspect was a real challenge for involving our user target groups who are per se quite digitally low-skilled. Nevertheless, the digital space was the opportunity to make the digital session more dynamic and provide a pleasant space where people would stay and have a good moment to share their experiences and knowledge. These COPs outcomes were achieved thanks to the previous experience of the COPs task leaders in managing complex and conflictive co-creational processes within the COPs methodological approach. In general, the digital sessions have been run in all kinds of platforms: GoToMeeting, Teams, Zoom and Google Meets. All of them work quite well with light preference for the Zoom virtual space that was more user-friendly for less digitalized participants.

Mutual support plays a key role in this INDIMO CoPs co-creation process. It was crucial to establish relationships based on trust, both within the CoPs but also among the 5 CoPs and with the collective training sessions provided by cambiaMO and VIC, both INDIMO partners.

CoPs were effective to produce knowledge and prioritize recommendations for the design and deployment of inclusive digital mobility services. Outcomes from the CoPs were also the input to several tools that the INDIMO project developed (e.g. toolbox of the Universal Design Manual - UDM, Universal Icons Languages-UIL, the cyber security and privacy assessment guidelines -CSG, and the Stakeholders evaluation tool – SET).

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